Register Number: …….

B.E. DEGREE EXAMINATIONS: NOV/DEC 2010

Third Semester

MECHANICAL ENGINEERING

U07ME301: Engineering Materials and Metallurgy

Time: Three Hours **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. Slow plastic deformation of metals under a constant stress is known as

   (a) creep (b) fatigue (c) endurance (d) plastic deformation

2. Mild steel belongs to the following category

   (a) low carbon steel (b) medium carbon steel (c) high carbon steel (d) alloy steel

3. In grey cast iron, carbon is present in the form of

   (a) cementite (b) free carbon (c) flakes (d) spheroids (e) nodular aggregates of graphite

4. Cast iron has

   (a) high tensile strength (b) its elastic limit close to the ultimate breaking strength

   (c) high ductility (d) all of the above

5. Basic constituents of monel metal are

   (a) nickel, copper (b) nickel, molybdenum (c) zinc,tin,lead (d) nickel, lead, tin (e) none of the above

6. Hardness of martensite is about

   (a) RC65 (b) RC48 (c) RC57 (d)RC80 (e) RC 32

7. Manganese in steel increases its

   (a) Tensile strength (b) hardness (c) ductility (d) fluidity (e) malleability

8. Which of the following elements does not impart hardness to steel

   (a) copper (b) chromium (c) nickel (d) silicon

9. Rockwell reading is a measure of the penetration caused by the

   (a) major load (b) minor load (c) both major and minor load (d) standard load

10. The elastic stress strain behaviour of rubber is

    (a) Linear (b) non linear (c) plastic (d) no fixed relationship (e) un predictable behaviour

PART B (10 x 2 = 20 Marks)

11. What is an alloy?

12. Define solid solution.

13. What is meant by "heat treatment"?

14. What is "critical cooling rate" in hardening of steel?

15. What is meant by precipitation hardening?

16. What is meant by stainless steel?

17. What is meant by polymerization?

18. What are the types of composites?

19. What is meant by fatigue fracture?

20. What is meant by creep fracture?

PART C (5 x 14 = 70 Marks)

21. (a) Explain: 1. Eutectic reaction 2. Eutectoid reaction
3. Peritectic reaction 4. Peritectoid reaction

(OR)

(b) Draw iron -carbide equilibrium diagram & mark on it all salient temperature andcomposition fields.

22. (a) Explain: 1.Annealing (4)
2. Spheroidising (4)
3. Normalizing (3)
4. Hardening (3)

(OR)

(b) Write short notes on: 1. Carburizing (4)
2. Nitriding (3)
3. Cyaniding (3)
4. carbonitriding. (4)

23. (a) Write short notes on: 1. High speed steel (3)
2. HSLA steel (4)
3. Marageing steel (4)
4. Tool steel (3)

(OR)

(b) Write short notes on: 1. Gray C.I. (3)

2. White C.!. (3)

3. Malleable C.!. (4)

4. Speroidal graphite C.!. (4)

24. (a) Describe the molecular structure, properties and application of the following polymeric materials.

(i) Poly methyl methacrylate (PMMA), Poly tetra f1uoro ethylene (PTFE) (7)

(ii) Polyethylene terephthalate (PET), Acryl nitride butadiene styrene (7)

(OR)

(b) Describe the molecular structure, properties and application of the following polymers.

(i) Polyvinyl chloride (PVC) , Polystyrene (PS) (7)

(ii) Polyethylene terephthalate (PET), Poly carbonate (7)

25. (a) Explain the Mechanisms of wear and tear preventions.

(OR)

(b) Explain Ceramic and organic coating.

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